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Characterization of Digital Systems
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The research effort within this reporting period began with a literature survey of the broad discipline of digital systems. The primary intent of that survey was to aid in determining the courses of action for attacking the proposed thesis that within this discipline an engineering language or characterization exists that is more fundamental than those ideas currently recorded in the literature. The principal investigator was joined in this search by Mr. Paul E. Gray, an instructor and colleague, whose dissertation research is being supported by this grant.

The preliminary research plan of attack consisted of four steps. The first step was that of a literature survey. The initial result of that survey was a division of the encountered material into the three commonly accepted segments of digital systems; the hardware, the software, and the switching theory segments.

The second step was to study the traits inherent in each segment and to select a fundamental set of traits from which to structure the proposed language. Of those traits common to each of these segments, only three were selected as a basis for the engineering language or characterization. The three selected traits are:

(a) order of succession-the logical consecutive manner in which all actions occur as a function of time within a digital system,

(b) digitated intelligence-the intelligence at any particular moment within a digital system is represented by a discernible collection of a finite number of physically observable quantities,

(c) internal digital supremacy-the result that once a digital system is actuated to perform its assigned task the digital system can accomplish that task without further external assistance.

The third step is that of using the three traits as a basis on which to structure a general definition of the digital system. This step of the characterization is presently under consideration.

The final step to be taken toward the characterization is that of listing those properties that a system must possess in order to be recognized as a digital system.

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